Alternative 6

Extensive Habitat Restoration with New Storage

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Emphasis

Reduce the conflict between fisheries and diversions by increasing fish populations through habitat restoration and by operating new storage to reduce constraints on exports.

Distinguishing Features

Physical and Structural Features

A high level of physical environmental improvements in and above the Delta, including restoration of various types of habitat, new screens, and salmon bypass at Old River. Convert one or more southern Delta islands into storage facilities.

Operational and Management Features

Diversions into Delta island storage November - January. Release water as needed to insulate Delta fish from impacts of export pumps. Obtain 100 TAF on San Joaquin River and manage for environmental purposes. Modify Clifton Court Forebay operations to reduce entrainment. Real time management.

Institutional and Policy Features

Subsidence management program on the Delta islands. A variety of other programmatic elements, including hatchery operations, management of water quality, and land use programs. No major institutional elements identified. However, water facilities and real time management components have institutional implications.

Benefits

- Improves physical habitat
- Improves San Joaquin River instream flows
- Reduces fish mortality cased by operations
- Reduces pollutant mass loading and improves timi of discharges
- Max flood control

Constraints and Concerns

- Mortality in south Delta export facilities remains significant
- Possible entrainment of fish from island storage diversions
- Transfer opportunities highly constrained

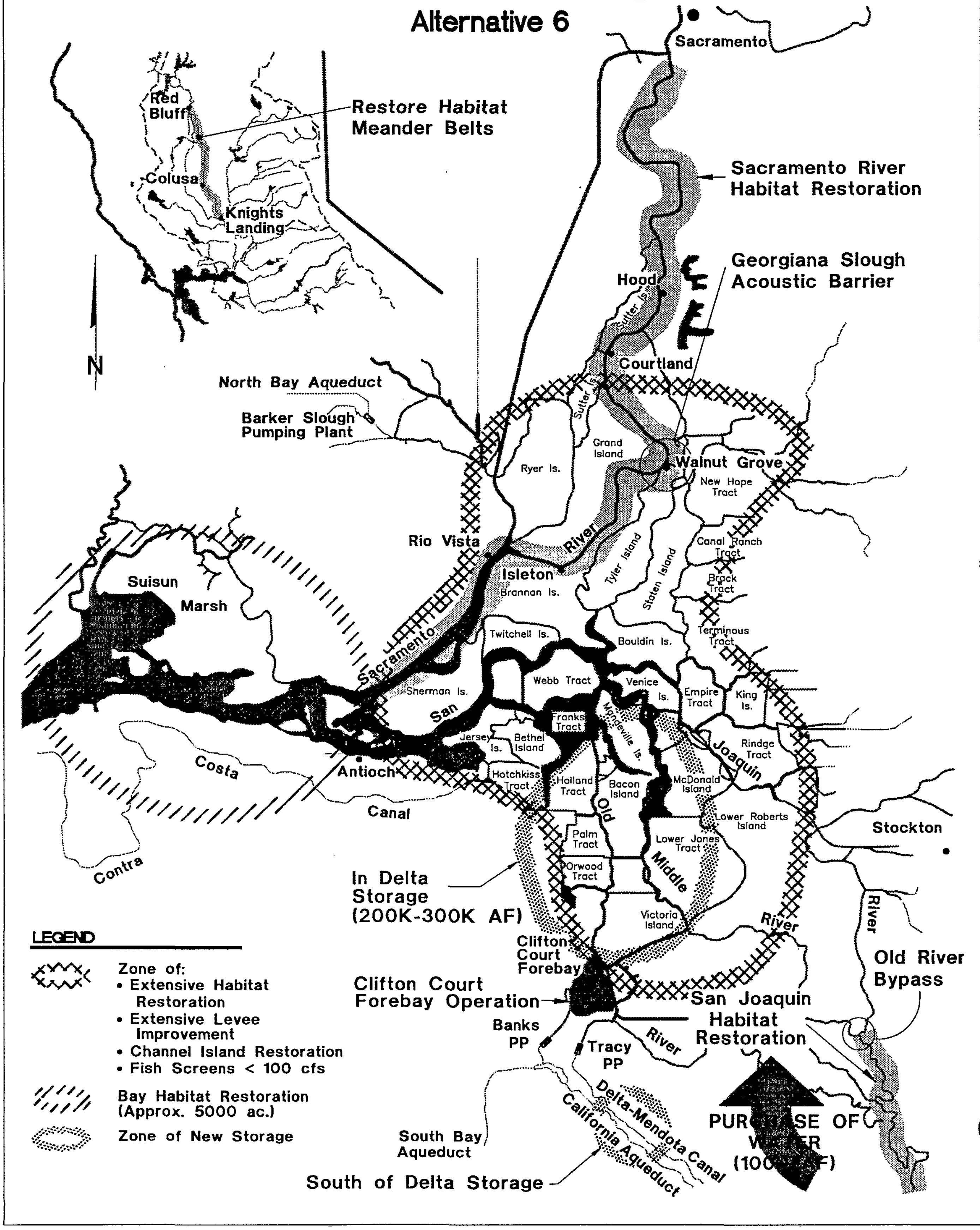
Max flood control!!

- ~~Delta islands remain vulnerable to flooding~~
- Uncertainty that ecosystem restoration will result i reduced constraints on diversions

PRELIMINARY DRAFT

Extensive Habitat Restoration With New Storage

Alternative 6



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Alternative 6

Extensive Habitat Restoration with New Storage

This alternative emphasizes extensive habitat restoration to improve ecosystem health and increase populations of special status species. Healthy populations of these species, including Delta smelt and winter-run chinook salmon, will be better able to withstand the impacts of Delta water export operations. New water storage in the Delta will be managed to benefit ecosystem health and water supply reliability. Restoration of leveed lands to tidal shallow water habitat would provide new habitat for fish species. Levee improvements will be made in ways that reduce system vulnerability while restoring nearshore aquatic habitat, as well as riparian vegetation. Long-term programs to manage subsidence will also reduce vulnerability. Source control of pollutants will increase water quality for all beneficial uses.

Habitat improvements will be made throughout the watershed to improve ecosystem quality and aid the recovery of species of special concern. In-Delta levee water side and land side modifications to provide shallow water habitat and riparian habitat will be made at many sites. Dredge material will be used to recreate new shallow water habitat out of deeper Delta island habitat. A long-term program to manage subsidence will be implemented. Habitat improvements will also be made upstream and downstream of the Delta, including riparian habitat and meander belts on the Sacramento River, channel improvements on the San Joaquin River, and conversion of diked wetlands to tidal wetlands between Collinsville and Carquinez Strait. Water supply reliability and Delta species will both benefit from new storage and modified water operations. About 100,000 acre feet will be purchased from sources on the San Joaquin River system to benefit fish. Uses might include pulses to aid fish movement, dilution of poor quality San Joaquin River flows, or exchange with export customers at critical times so Delta exports could be curtailed. This could allow for flexibility of exchange with San Joaquin users. An in-Delta island reservoir will be developed (up to 200,000 to 300,000 acre feet) to be used to create additional storage and provide water to the export pumps at critical fish migration times. Operation of Clifton Court Forebay will be modified to reduce intake of fish. Delta water quality will be improved through agricultural, industrial, and municipal wastewater reclamation and reuse, timing and dilution of releases of poor quality agricultural drainage, and better source control.

Physical and Structural Features

Delta Levee Habitat Restoration— Restore approximately 100 levee miles of shallow water, riverine and riparian habitat in the Delta to provide forage and cover habitat for resident and anadromous fish, and to provide other benefits associated with riparian habitat. Actions might include setback levees, creation of berms, creation of shallow water habitat, and increased vegetation on levees in coordination with efforts to improve flood protection. Considerations for site selection will include distance from hazards such as pumping plants, protection from waves generated by wind and boat wakes, importance of island integrity to the maintenance of Delta water quality, and need to improve channel capacity and structural stability of levees. Good candidate areas are Twitchell Island along Threemile Slough and Sevenmile Slough, Georgiana Slough, and the north and south forks of the Mokelumne River.

Delta Habitat Restoration— Restore shallow water and tidal wetland habitat in the Delta to provide spawning areas, forage areas, and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Also restore shallow water shoreline habitat along margins of the lower Sacramento and San Joaquin channels, and tributary sloughs including Barker Slough, Lindsey Slough, and Parker Island. Riparian, wetland, and terrestrial habitat would also be restored on Delta islands and upland areas adjacent to river channels such as Decker Island.

Sacramento River Habitat Restoration— Restore habitat and create meanders along the Sacramento River upstream of the Delta to increase survival and spawning success of anadromous fish, and to provide other benefits. Construct segments of meander belt where feasible (such as Red Bluff to Colusa) and restore segments of riparian habitat in more controlled stretches of the river (Colusa to Knights Landing).

San Joaquin River Habitat Restoration— Restore channel features to improve fish survival. Actions may include restoration of deeper, narrower channel areas to keep water cooler, and isolation of quarry areas to protect young fish from predation and straying.

Bay Habitat Restoration— Restore about 5,000 acres of tidal wetlands between Collinsville and Carquinez Strait. Actions may include conversion of diked wetlands to tidal wetlands or use of dredge spoils to create wetland areas. The resulting habitat types will provide wet year spawning habitat for Delta smelt, rearing areas for salmon, as well as habitat for diverse wildlife including canvasback and redhead ducks.

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Channel Islands— Restore and protect channel islands. Evaluate contribution of upstream meander belts to sediment deposition at channel islands. Establish zones for different types of boating use so some areas are protected from large boat wakes.

In-Delta Storage Close to the Pumps— Convert one or more Delta islands such as Bacon Island, Mandeville Island, or Victoria Island into a reservoir to provide operational flexibility and generate up to 300,000 acre feet of storage. The levee around the storage reservoir will be up to several hundred feet wide to support riparian forest cover and provide opportunities for creation of pockets of shallow water habitat. The shallow inward slopes of the levees might support water grass habitat for migratory waterfowl, depending on reservoir operation. The reservoir might be suitable for Sacramento perch habitat. Water will be diverted onto islands through screened diversions during the months of November, December or January depending on the type of water year. Water will be released from March to July to provide water to the pumps at times when project operations would otherwise draw fish into the Delta or to the pumps. Water may also be used to provide other fisheries benefits.

? why would we want them on the island

Install Bypass at Mouth of Old River— Construct a bypass at the mouth of Old River that will encourage outmigrants to stay in San Joaquin River while allowing a managed flow down Old River.

Fish Screens— Install fish screens on diversions over 100 cfs that are on fish migration routes in the Delta, rivers, and tributaries.

Flood Protection Level— This action provides a maximum level of protection to Delta system levees. First, all levees not yet providing a level of protection equivalent to the hazard mitigation plan (HMP) will receive the necessary upgrades to their levees to meet HMP standards. A level of flood protection equivalent to the maximum credible earthquake (MCE) standard would be provided to critical western Delta islands (such as Sherman and Jersey islands), and islands with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.), and on levees surrounding islands used for storage. A level of flood protection equivalent to the US Army Corps of Engineers' Public Law (PL)- 99 standard would be provided to: (1) islands having infrastructure of local importance (such as New Hope Tract, Bouldin Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Island); and (2) islands having valuable habitat, but not necessarily infrastructure, (including, but not necessarily limited to Canal Ranch, Brack Tract, Staten Island, Venice Island, Rindge Tract, and Big Mandeville Island).

Channel Improvements and Levee Maintenance— A maximum level of channel improvements (e.g. widening for improved conveyance), levee maintenance and stabilization (e.g. stabilizing berms), the modification of agricultural practices to reduce subsidence potential, setback levees, providing funding for maintenance and stabilization, and maintaining and/or reconstructing levees are indicative of the range of actions that would be implemented with the intent of reducing the risk of the Delta levee system with respect to its value in providing water supply, water quality, ecosystem quality, and land use/infrastructure benefits.

Operational and Management Features

Real time Monitoring— Establish an adequate real-time monitoring to determine location of species of special concern so that project operations can be effectively managed to reduce losses of fish and minimize effects on habitat.

Acoustic Barrier at Mouth of Georgiana Slough— Operate an acoustic barrier at the mouth of Georgiana Slough for anadromous fish. Work to improve the effectiveness of behavioral barriers. Evaluate use of acoustic barriers at the Delta Cross Channel and Threemile Slough.

Storage of Agricultural Tile Drain Water— Develop a program with irrigation districts to store tile drain water to be released at times when pulse flows can provide dilution.

Modify Clifton Court Forebay Operation— Modify operations of Clifton Court Forebay so that it does not entrain as many fish into the forebay during typical operation. Install regulating gates into Italian Slough so that water can be drawn in over time at a lower velocity. This will reduce the number of fish lost to predation in the forebay.

Mark Hatchery Fish—Mark salmon produced in hatcheries to facilitate selective catch by commercial and recreation fisheries.

Pen Rearing of Striped Bass— Rear striped bass in pens to maintain recreational fishery and avoid operational constraints on water projects due to spawning bass.

Mine Drainage Remediation— Remediate discharges from abandoned mines in tributaries of the upper Sacramento River downstream of Shasta Dam to the maximum extent reasonably possible.

Management of Water Quality— Implement actions such as source control regulations for agricultural drainage, retiring lands with drainage problems, and other cost-effective management of urban, agricultural, and industrial discharges and runoff to improve Delta water quality.

Institutional and Policy Features

Emergency Levee Management Plan— An emergency levee management plan would provide necessary funding and direction to reclaim Delta islands in the event of inundation to continue protection of Delta functions as an integrated resource system. Funding would be provided to ensure that a suitable amount of equipment and materials would be readily available to rapidly respond to flood fights.

Water Quality Standards— Maintain current standards for Delta water quality and position of X2.

Other Programs— Implement recommended habitat restoration actions from other programs, including CVPIA and the Anadromous Fish Restoration Plan. Examples of specific actions include small dam removal on Clear Creek, dam removal on Battle Creek, establishment of a population of winter run chinook salmon on Battle Creek.

Obtain Environmental Water— Obtain about 100,000 acre feet from San Joaquin water users to reduce conflicts between fisheries and diversions. Water could be used to provide pulse flows to move Delta smelt downstream, away from diversion points. Another use might be dilution of poor quality San Joaquin River flows, providing benefits for fisheries, water supply, and water quality. New south-of-Delta storage would allow this water to be used as exchange water so that Delta diversions could be reduced at critical ties to protect fisheries without affecting export supplies.

Sacramento River Habitat Restoration— Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River from Sacramento to Collinsville. First step will be to provide matching funds for Corps of Engineers feasibility study. Subsequent restoration would be funded 75 percent by COE.

Preserve Agricultural Land Uses— Establish programs to preserve agricultural land uses that help to protect the ecosystem. Examples include limiting levee restoration to levels that are inadequate to permit residential construction on Delta islands, and

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incentive programs to preserve habitats such as pasture, which is important for sandhill cranes.

Implement a Subsidence Management Program— Develop and implement a very long-term subsidence management program that prescribes land use strategies related to the degree of subsidence. For some deep Delta islands (below -10 feet in elevation) eliminate traditional agriculture in favor of seasonal wetland management to stop and reverse subsidence. At elevations from -10 to -3 feet, stabilize subsidence by rotating seasonal wetland with wildlife-friendly agricultural use. At elevations from -3 to +3 feet, maintain agricultural uses on some parcels, identify other areas for restoration to tidal wetlands.

CALFED Regulatory Team— Determine how to implement a regulatory team to facilitate getting permits for environmental restoration projects. Each member agency would have a key person on team.

Response Program for Introduced Species Control— Establish and fund a rapid response program among environmental agencies to provide a fast and effective means of managing introduced species in the Bay-Delta. Expand continuing management programs for nuisance species such as water hyacinth.

Dredge Materials— Establish a policy that all future clean dredge material out of the Delta above Chipps Island should go into Delta restoration and levee maintenance projects.

Safe Harbor for Maintenance— Encourage farmers and levee maintenance districts to leave habitat areas undisturbed when feasible by providing variances from ESA regulations.

Preliminary Assessment

Benefits

Ecosystem Quality— This alternative will greatly enhance ecosystem quality through restoration and enhancement of riverine, riparian, wetland, and adjacent terrestrial habitat, restoring fish spawning, rearing, and feeding habitats and improve fish survival. Fish water from the San Joaquin will greatly enhance the fisheries agencies' ability to assist fish passage from the rivers through the Delta.

The in-delta storage will add flexibility for exchange with export water to reduce the cross Delta movement of fish toward south Delta pumping plants. Improvements to Clifton Court Forebay will also help increasing survival of fish that are drawn into the forebay.

Water Supply— This alternative improves reliability by increasing fish populations (through habitat improvements and reduced diversion effects), reducing the likelihood of regulatory interventions in export operations. Operation of in-Delta storage and use of water from San Joaquin system further reduce constraints on exports.

Water Quality— This alternative relies on core actions including point and non-point source controls and mine drainage remediation to improve water quality.

System Reliability— Creation of shallow water habitat simultaneously with levee reconstruction provides better levees and protection for adjacent land uses. Improvement of the levees around the critical western islands protects those islands as well as protecting in-Delta and agricultural export water supplies from salinity intrusion due to island failure.

Constraints and Concerns

Fisheries— Though great improvements to habitat and fish survival will occur, complete restoration of important fish populations may not be possible without reducing the use of the Delta as a water supply conduit and greatly reducing exports from the south Delta. Mortality in South Delta export facilities remains significant. Possible entrainment of fish from island storage diversions.

Transfers— Water transfer opportunities remain highly constrained because the existing configuration is unchanged.